United States Patent [19]

Raitto

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[54] **NIGHTSTICK**

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[21] Appl. No.: **708,700**

[22] Filed: **Mar. 6, 1985**

Related U.S. Application Data

[63] Continuation of Ser. No. 444,480, Nov. 24, 1982.

[51] **Int. Cl.**[4] **F41B 15/02**

[52] **U.S. Cl.** ..... **273/84 R;** 273/DIG. 1; 264/259

[58] **Field of Search** ..... 273/84 R, DIG. 6, DIG. 1, 273/84 ES

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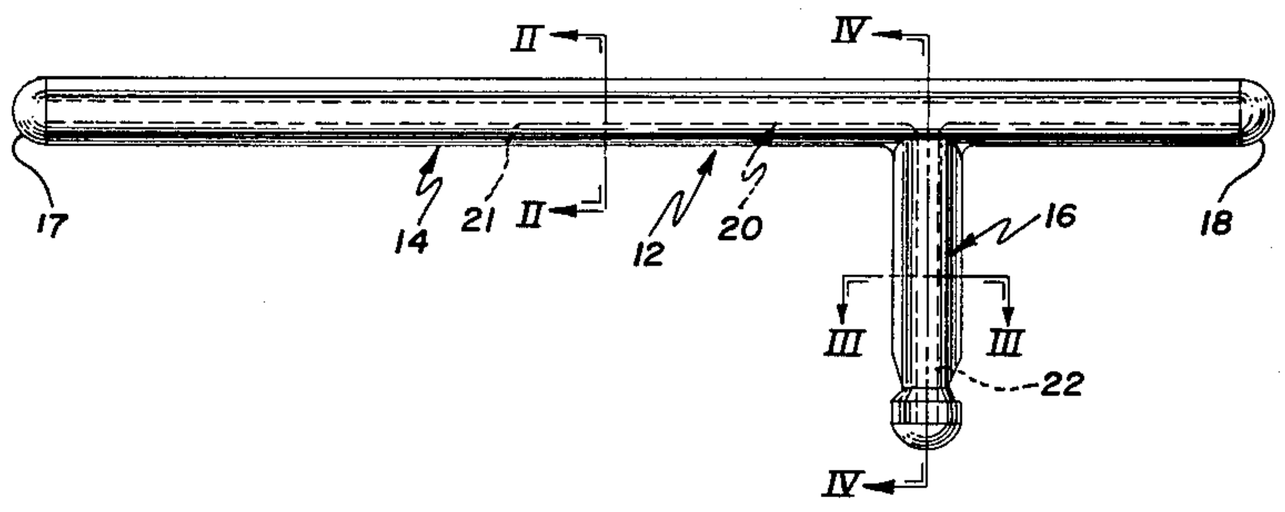
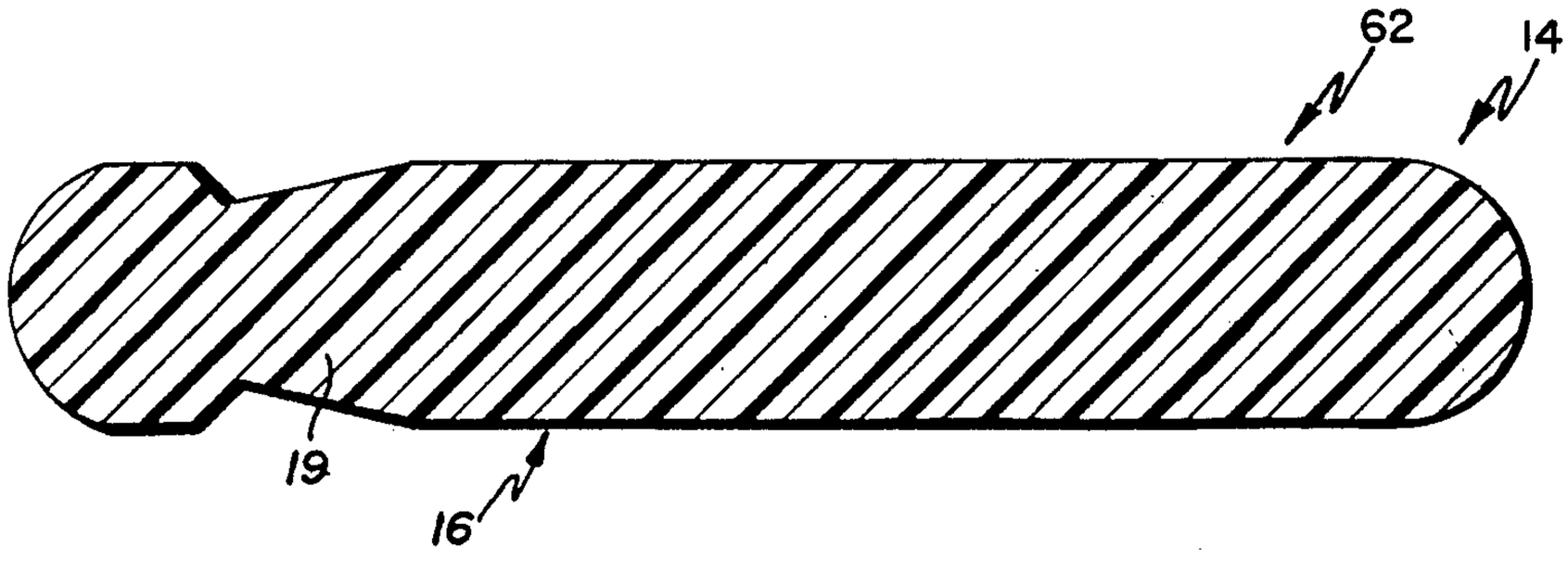
Attorney, Agent, or Firm—Blodgett & Blodgett

[57] **ABSTRACT**

A nighstick comprising an elongated cylindrical main body portion and a generally cylindrical handle portion which is integral with the main body portion and extends at a right angle to the central longitudinal axis of the main body portion. The handle portion is spaced from both ends of the main body portion and is substantially closer to one of the ends. The invention includes a nightstick in which the handle and main body portions are molded as a single integral unit of thermoplastic polycarbonate material. The invention also includes a nightstick as described above which consists of a T-shaped metallic core embedded in thermoplastic material and the method of making same. Another variation of the invention includes a nightstick in which the main body portion is covered by an outer layer of elastomeric material. Still another variation of the invention includes a nightstick in which the main body portion and the handle portion each consist of a metal tube filled with elastomeric material.

1 Claim, 15 Drawing Figures





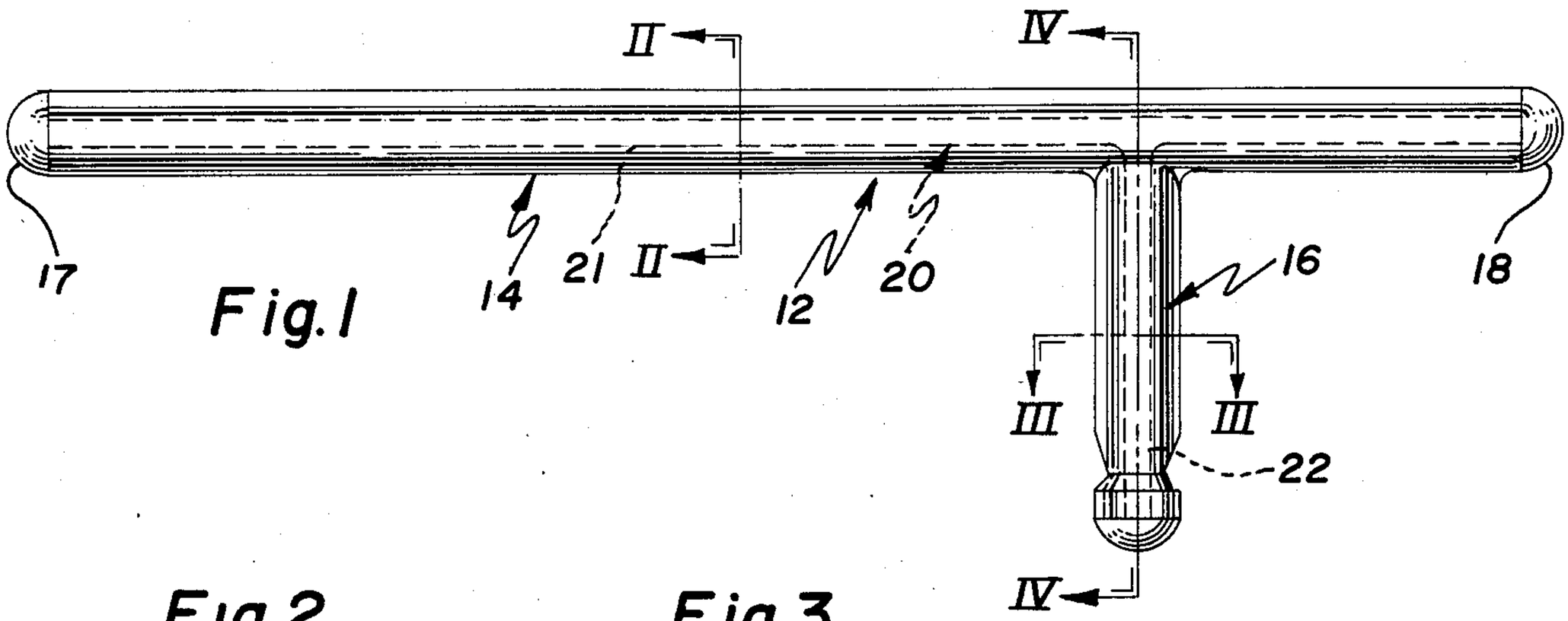


Fig. 1

Fig. 2

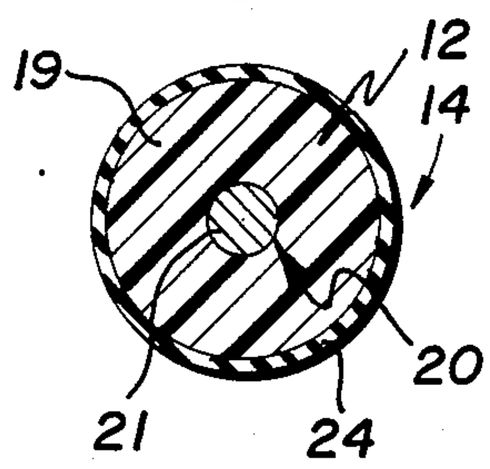
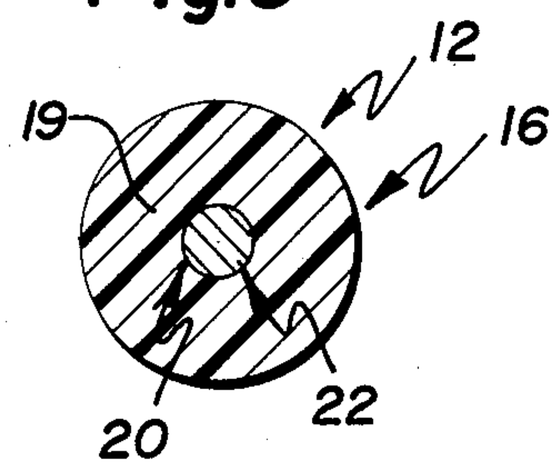


Fig. 3



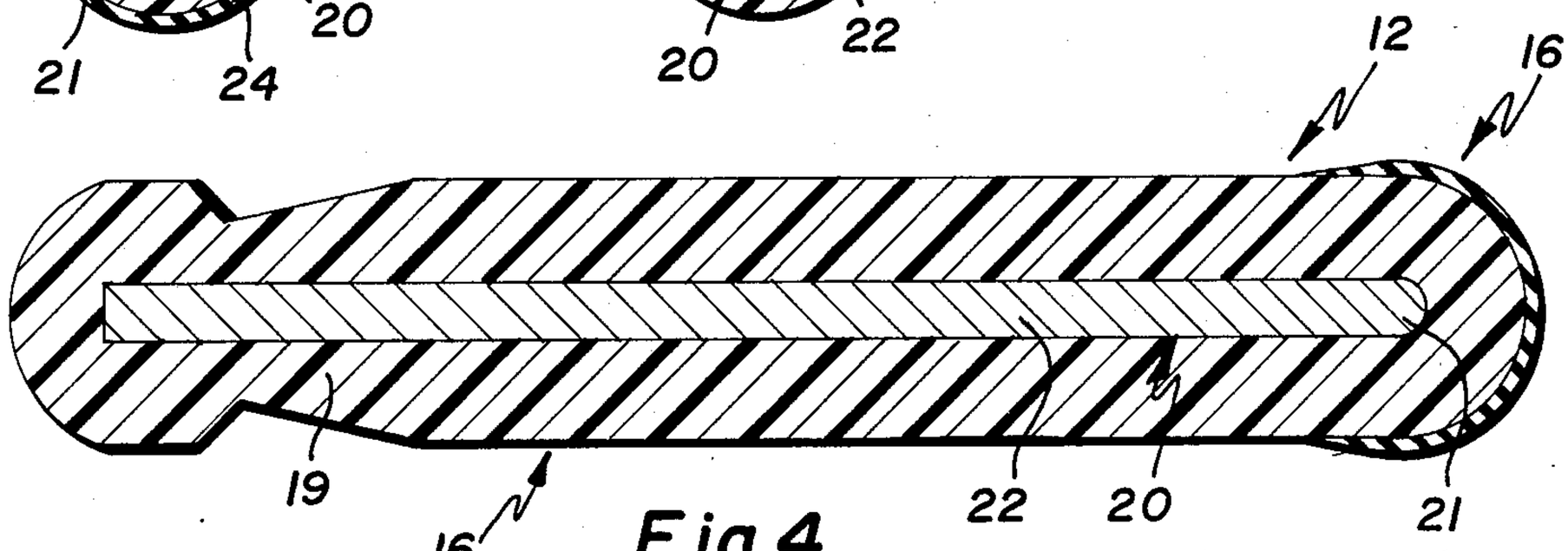


Fig. 4

Fig. 5

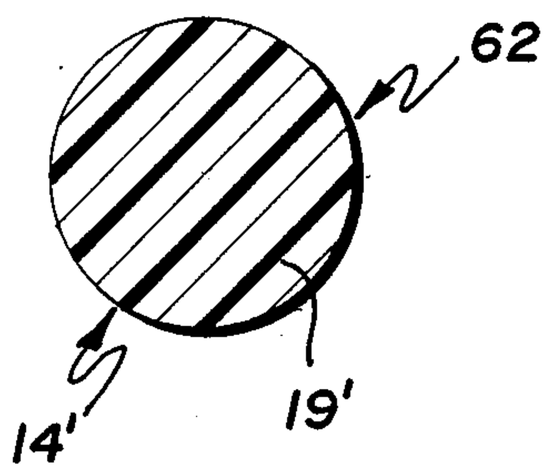


Fig. 6

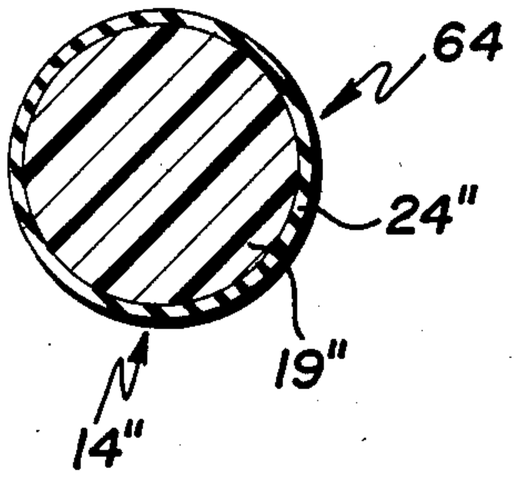
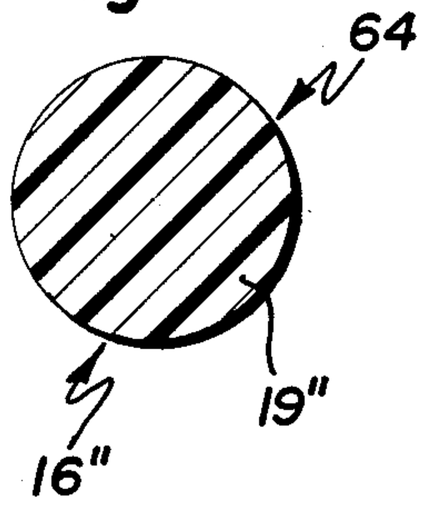


Fig. 7



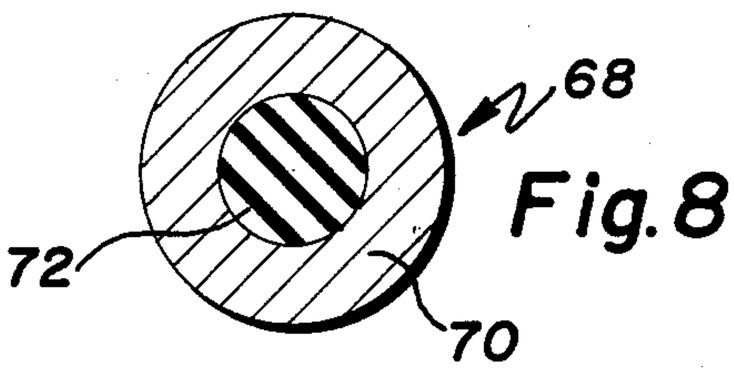


Fig. 8

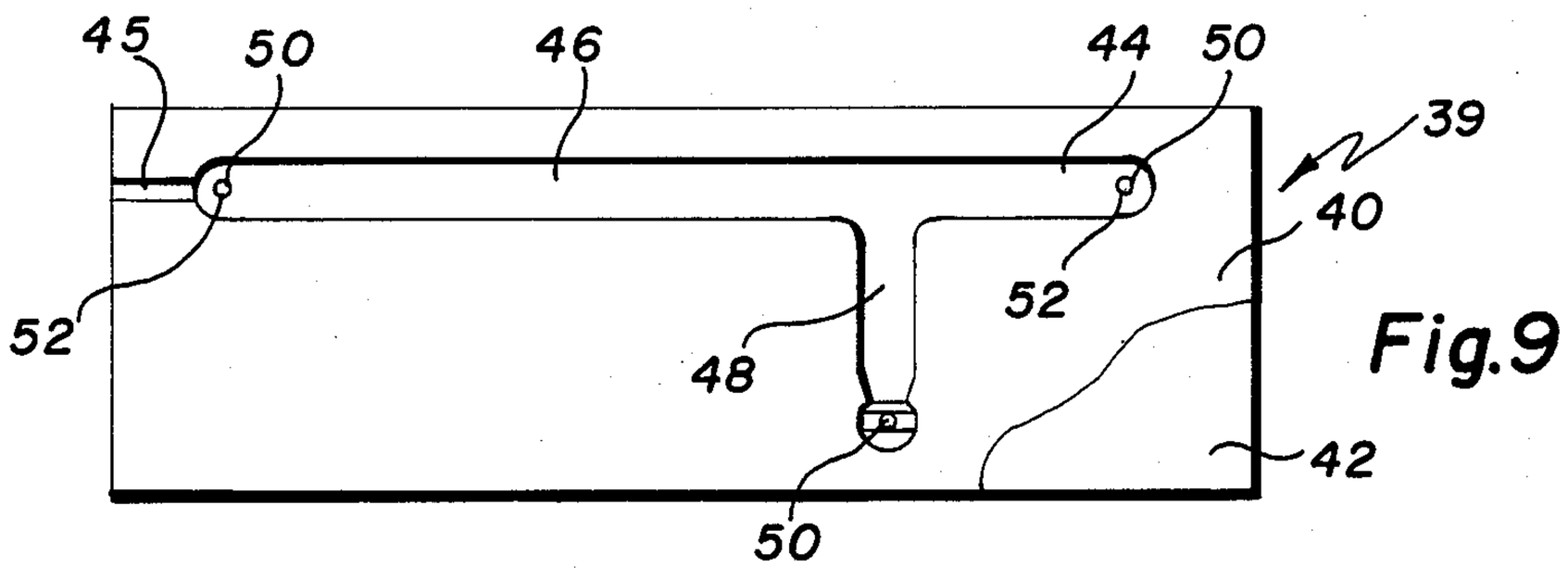


Fig.9

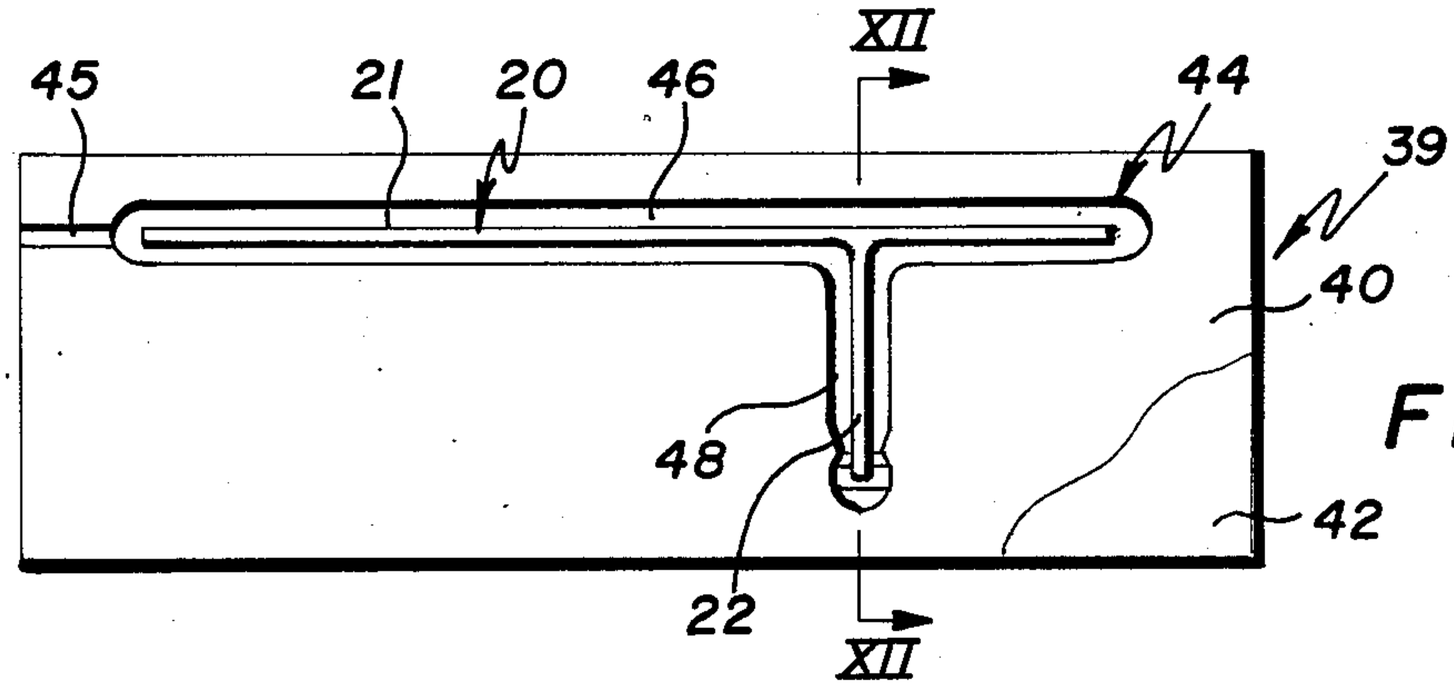


Fig.10

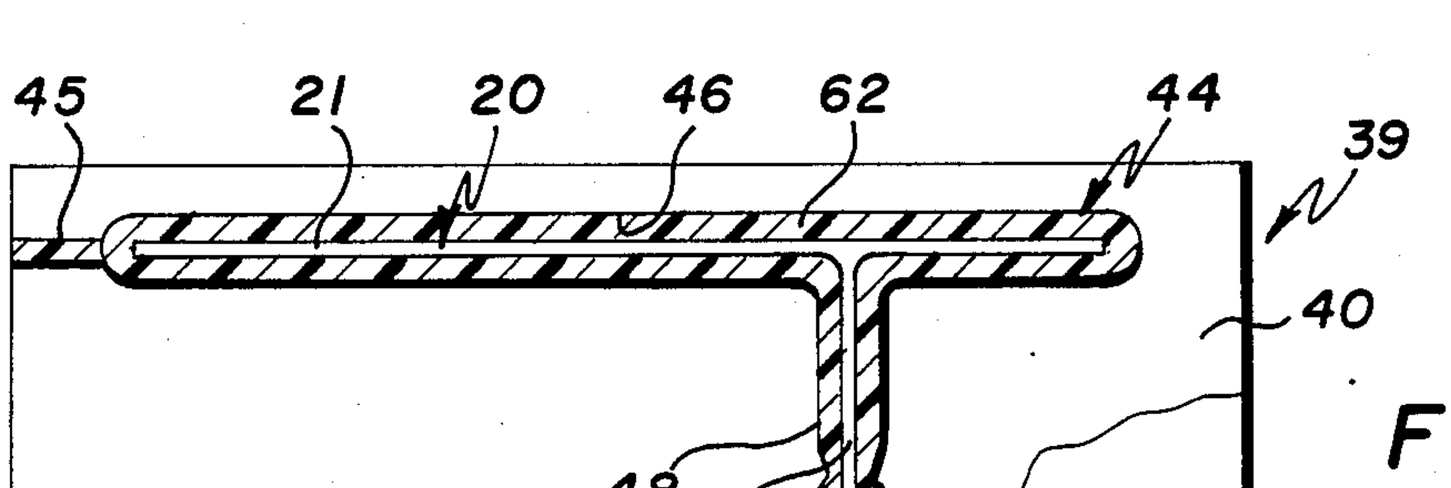


Fig.11

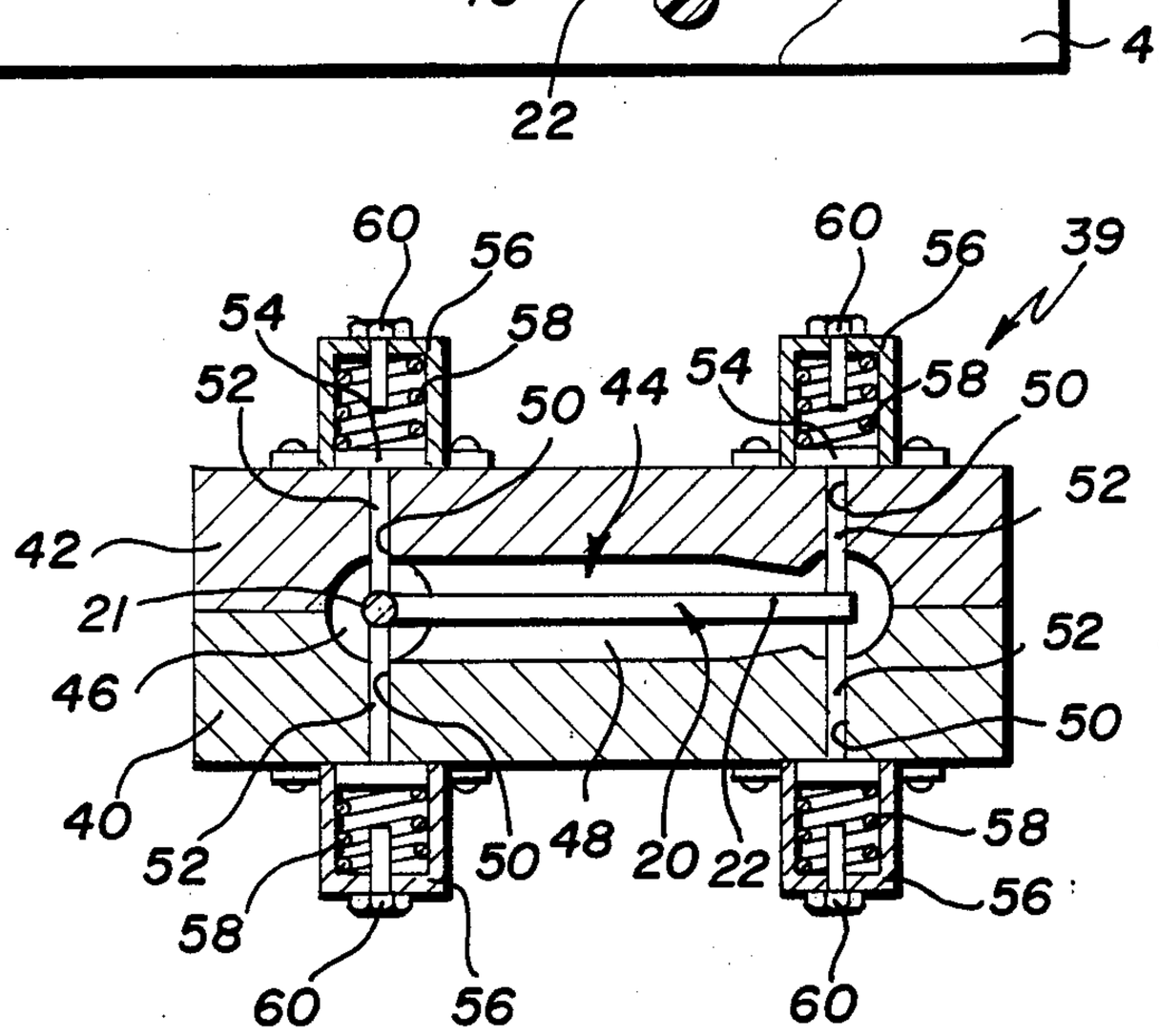


Fig.12

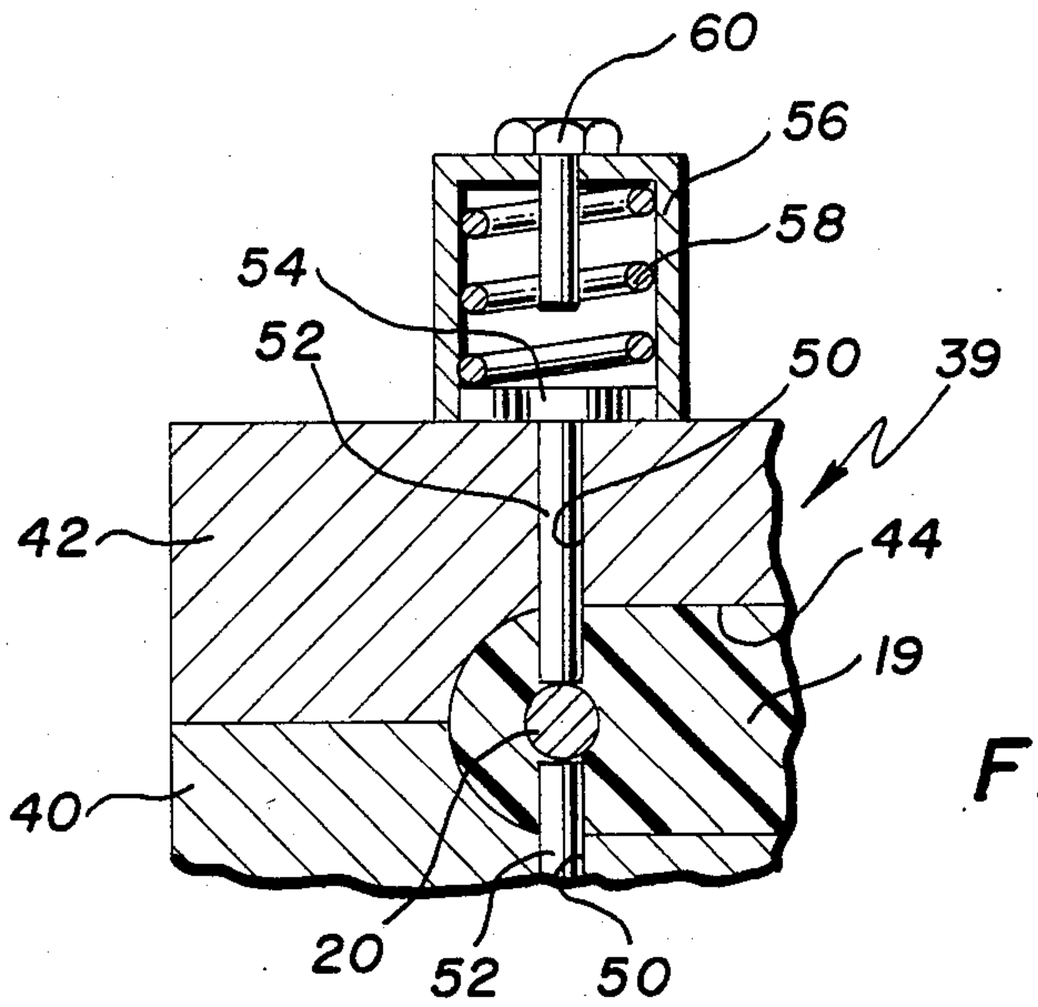

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Fig. 13

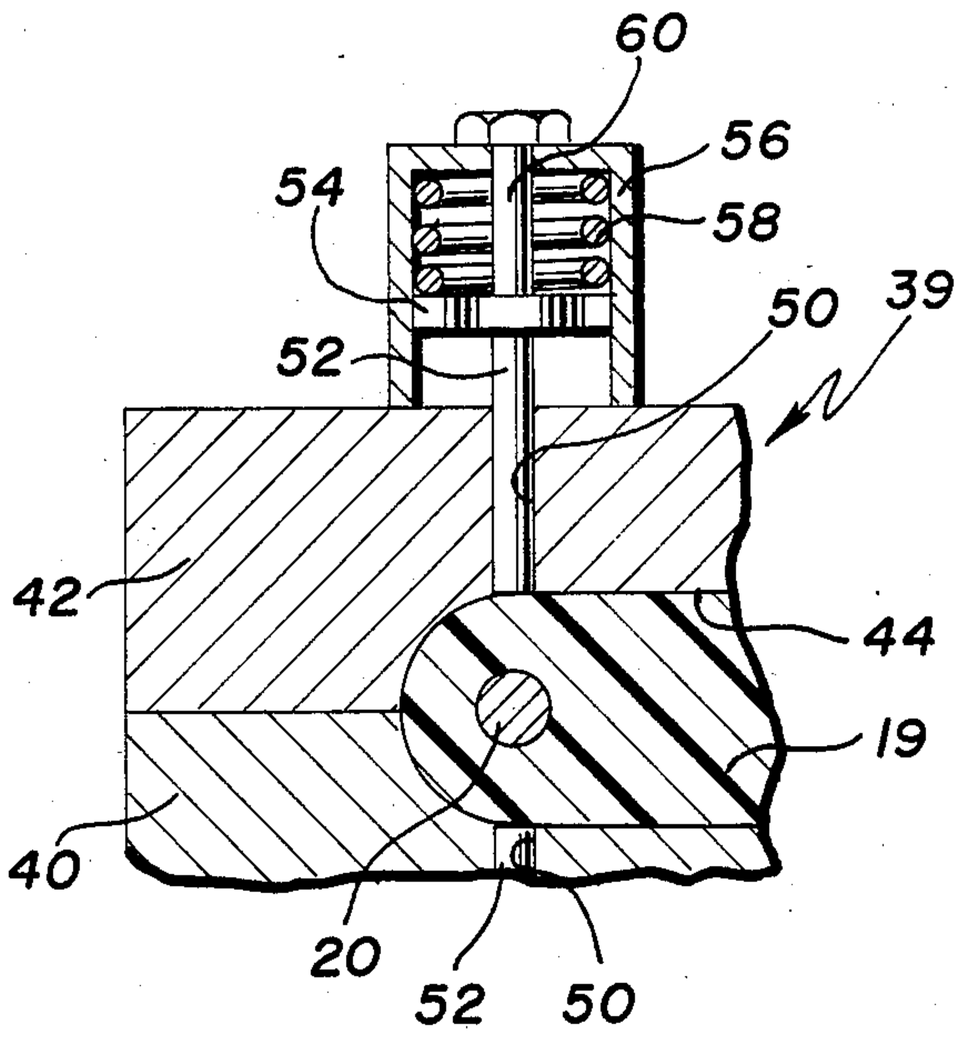
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Fig. 14

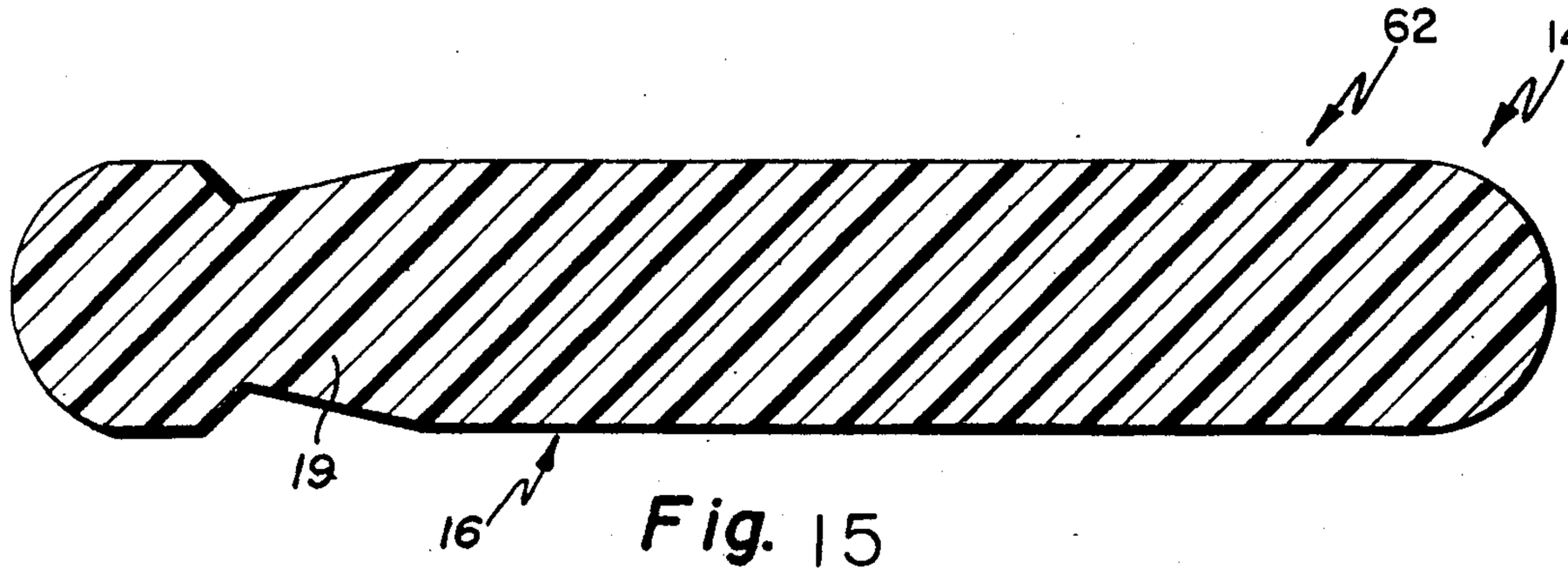

Fig. 15

NIGHTSTICK

This is a continuation of co-pending application Ser. No. 444,480, filed on Nov. 24, 1982.

BACKGROUND OF THE INVENTION

The invention relates generally to a nightstick of the type used by law enforcement personnel and a method of making the nightstick. Specifically, the invention relates to the type of nightstick which comprises an elongated cylindrical main body portion and a generally cylindrical handle portion which extends at a right angle to the main body portion. The handle is spaced from both ends of the main body portion, but is substantially closer to one of the ends.

The handle and main body portions of the prior art nightstick are separate pieces which are machined from extruded thermoplastic stock. After machining, the handle portion is bolted or screwed to the main body portion.

One of the principle disadvantages of the prior art nightstick is that after a period of use, the handle becomes loose and must be continuously tightened. Sometimes, the handle breaks away from the main body portion during use. Occasionally, the main body portion breaks as a result of a particularly forceful blow of the nightstick. When the nightstick breaks, a portion of the nightstick flies away at high velocity, thus creating a potential hazard to the user or to an innocent bystander. Breakage usually occurs at the most critical moment of use, rendering the nightstick ineffective for further use. This represents the loss of a controlled subduing force and creates a hazardous situation for the user. These and other difficulties experienced with the prior art devices have been obviated in a novel manner by the present invention.

It is, therefore, an outstanding object of the invention to provide a nightstick of the general type described above in which the handle never becomes loose with respect to the main body portion.

Another object of the invention is the provision of a nightstick in which breakage of the nightstick is greatly minimized.

A further object of the present invention is the provision of a nightstick which requires no machining and assembly.

It is another object of the instant invention to provide a nightstick which includes a reinforcing element that further reduces the possibility of breakage and eliminates the possibility of a broken piece from flying away, if breakage does occur.

It is a further object of the invention to provide a nightstick which is strong, rigid, and has shock absorbing qualities.

A still further object of the invention is the provision of a nightstick which is simple in construction, which is inexpensive to manufacture and which is capable of a long life of useful service.

With these and their objects in view, as will be apparent to those skilled in the art, the invention resides in the combination of parts set forth in the specification and covered by the claims appended hereto.

SUMMARY OF THE INVENTION

In general, the invention consists of a nightstick having an elongated cylindrical main body portion and a generally cylindrical handle portion which is integral with and extends at a right angle to the main body portion. The handle portion is spaced from both ends of the main body portion and is substantially closer to one of the ends. More specifically, the main body portion and the handle each comprise a metal core surrounded by thermoplastic material. The metal core of the handle being integral with the metal core of the main body portion and the plastic portion of the handle being integral with the plastic portion of the main body portion. The invention also comprises a method of injection molding a thermosplastic nightstick with a metal core.

The invention also consists of a mold for plastic injection molding apparatus for forming a plastic article having a core element embedded therein.

BRIEF DESCRIPTION OF THE DRAWINGS

The character of the invention, however, may be best understood by reference to one of its structural forms, as illustrated by the accompanying drawings, in which:

FIG. **1** is a side elevational view of a nightstick embodying the principles of the present invention,

FIG. **2** is a vertical sectional view of the main body portion of the nightstick taken on the line II—II of FIG. **1**,

FIG. **3** is a horizontal sectional view of the handle portion of the nightstick taken on the line III—III of FIG. **1**,

FIG. **4** is a vertical sectional view of the nightstick taken on the line IV—IV of FIG. **1**,

FIG. **5** is a cross-sectional view of a first modification,

FIGS. **6** and **7** are cross-sectional views of a second modification,

FIG. **8** is a cross-sectional view of a third modification,

FIGS. **9–11** are diagrammatic views which illustrate a method of forming a nightstick of the preferred form of the invention which is illustrated in FIGS. **1–4**,

FIG. **12** is a vertical cross-sectional view taken on the line XII—XII of FIG. **10**,

FIGS. **13** and **14** are fragmentary cross-sectional views of a portion of FIG. **12**, on an enlarged scale, and

FIG. **15** is a vertical cross sectional view of the first modification through the handle and main body portions of the nightstick.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring first to FIGS. **1–4**, the nightstick of the preferred embodiment is generally indicated by the reference numeral **12** and consists of a main body portion generally indicated by the reference numeral **14** and a handle portion generally indicated by the reference numeral **16**.

The main body portion **14** of the nightstick is elongated and cylindrical. The handle portion **16** is generally cylindrical and extends at a right angle from the main body portion **14**. The handle **16** is integral with the main body portion **14** and is spaced from the opposite ends of the main body portion, indicated at **17** and **18**. However, the handle **16** is substantially closer to the end **18** than the end **17**. The nightstick **12** consists primarily of a relatively rigid thermoplastic material **19** which surrounds a metal core generally indicated by the reference numeral **20**. The plastic material is preferably polycarbonate or nylon. The metal core **20** has a main body portion **21** which extends within the main body **14** and a handle portion **22** which extends in the handle

portion **16**. The main body portion **21** and the handle portion **22** of the core are integral and preferably made of steel. The thermoplastic material **19** which surrounds the portions **21** and **22** of the core is also integral. The outside of the main body portion **14** is covered with a elastomeric material **24** which may be natural rubber or synthetic rubber such as polyurethane.

The method of making the nightstick of the preferred embodiment is illustrated in FIGS. **7–10**. The nightstick **12** is made by providing a plastic injection mold generally indicated by the reference numeral **39** and consisting of two separable half portions **40** and **42**. The mold **39** contains a cavity, generally indicated by the reference numeral **44**, having the shape of the nightstick **12**. Half of the cavity **44** is in the mold half **40** and the other half of the cavity **44** is in the mold half **42** as shown in FIG. **12**. The cavity **44** consists of a main body portion **46** and a handle portion **48**. An inlet port **45** extends from the main body portion **46** to conventional plastic injection apparatus, not shown.

Referring particularly to FIG. **12**, each mold half has a plurality of apertures **50** which extend from the cavity **44** to the outside of the mold. There is an aperture **50** at each end of the main body portion **46** and at the end of the handle portion **48** for each mold half. The apertures **50** of the mold half **40** are axially aligned with the corresponding apertures **50** of the mold half **42**. Each aperture **50** contains a pin **52** which is axially slidable within the aperture. The inner free end of each pin **52** extends into the cavity **44**. The outer end of each pin is attached to a flange **54** which is slidably mounted within a housing **56** which is fixed to the outside of the mold half. A spring **58** bears against the flange **54** and urges the pin **52** toward the cavity **44** so that the free ends of each opposing set of pins **52** are urged toward each other as shown in FIGS. **12** and **13**. Each housing **56** is provided with an adjustable stop **60** which prevents the inner free end of the pin **52** from being pushed outwardly beyond the intersection of the aperture **50** and cavity **44**.

At the beginning of a molding operation, the upper mold half **42** is separated or opened from the lower mold half **40**. The reinforcing core **20** is placed within the cavity **44** so that the main body portion **21** of the core lies in the main body portion of the cavity and the handle portion **22** of the core lies within the handle portion of the cavity. The core **20** is supported on the lower pins **52**. The core **20** is preferably made of a ferrous material and the lower pins **52** are magnetized for holding the core **20** in position. The upper mold half **42** is joined to the lower mold half **40** so that of the lower ends of the upper pins **52** engage the core **20**. The core **20** is thereby retained between the upper and lower sets of pins **52** and positioned centrally of the cavity **44**, vertically as shown in FIG. **12** and horizontally as shown in FIG. **10**. Once that the core **20** is properly positioned within the mold cavity, plasticised thermoplastic material **19** is injected under pressure into the cavity through the inlet port **45** until the entire cavity is filled as shown in FIGS. **11** and **13**. When the pressure of the thermoplastic material **19**, within the cavity **44** reaches a value which is sufficient to overcome the biasing effect of the springs **58**, the pins **52** are forced outwardly away from the core **20** until the flanges **54** strike the stops **60**. At this point, the inner ends of the pins are located at the intersection of the apertures **50** and the cavity **44** as shown in FIG. **14**. A portion of the end surface of each pin **52** must be exposed to the plastic material for the pin to be pushed out of the mold by the pressure of the plastic material. In the preferred form of the invention, a cylindrical reinforcing core is used so that it is sufficient that the end surface of the inner free end of the pin be flat or slightly convex. However, if a rectangular core were to be used, the end surface of the pin **52** would have a different configuration, for example, convex.

It is also contemplated that the mold can be used for molding many other articles having a core element embedded in thermoplastic material. After the thermoplastic material has cooled or curred sufficiently, the mold halves **40** and **42** are opened and the nightstick, consisting of a metal core embedded in thermoplastic material, is removed from the mold. The sprue of thermoplastic material from the inlet port **45** is removed from the nightstick, resulting in a finished product. The nightstick of the preferred embodiment, illustrated in FIGS. **1–4**, is produced by coating the main body portion of the nightstick after it is taken out of the plastic injection mold. The elastomeric coating may be applied by any conventional means, such as an additional molding process or mechanical application.

The nightstick **12** consists primarily of a thermoplastic material which provides the desired weight and handling characteristics for the nightstick. The thermoplastic material **19** of the handle portion **16** is integral with the thermoplastic material of the main body portion **14**, so that the handle will not become loosened with respect to the main body portion and is much less likely to break from the main body portion. The metal core **20** further reduces the possibility of breakage of the handle portion **16** from the main body portion **14** as well as breakage along any part of the main body portion. In addition, if breakage does occur, it will be in the nature of a fracture of the thermoplastic material and the fractured portion will be prevented from flying away from the nightstick by the core, since it is molded to the core.

The layer of elastomeric material **24** provides protection to the user for certain maneuvers commonly performed when the nightstick is used for self-defense and for added control of the use of force when the nightstick is used for the purpose of subduing an individual. When the nightstick is used for self-defense, it may be held in front of or against the users body to absorb a blow by an attacker. The elastomeric material softens the blow at the point of impact on the stick and also provides a cushioning affect from the blow at the point where the stick is in contact with the users body. It is preferred that there be no elastomeric material on the handle portion of the nightstick since some maneuvers of the nightstick require twirling of the nightstick, wherein the handle portion **16** rotates within the users hand.

FIRST MODIFICATION

Referring to FIGS. **5** and **15** there is illustrated cross sections of a first modified nightstick, generally indicated by the reference numeral **62**. The nightstick **62** has the same outer configuration as the nightstick **12**, illustrated in FIG. **1**, including a main body portion and a handle portion, except that the entire nightstick is made of thermoplastic material **19'**. The main body portion of the nightstick **62** is shown in cross section in FIGS. **5** and **15** and is generally indicated by the reference numeral **14'**. The main body portion **14'** and the handle portion **16'** of the nightstick **62** are integral as shown in FIG. **15** and formed by being molded as a single unit. The nightstick **62** is molded in a manner

similar to that shown in FIGS. 7–10 except that no core is placed in the mold cavity prior to the introduction of thermoplastic material into the mold.

The first modified nightstick **62** retains many of the advantages of the preferred embodiment due to the integrally formed handle and main body portions. However, the nightstick **62** is simpler in construction, easier to manufacture and relatively inexpensive.

SECOND MODIFICATION

Referring to FIGS. **6** and **7**, there is shown a second modified nightstick, generally indicated by the reference numeral **64**. The nightstick **64** has the same general configuration as the nightstick **12** illustrated in FIG. **1**, including a main body portion and a handle portion, except that the nightstick **64** is made substantially of thermoplastic material **19''** and coated with a layer of elastomeric material **24''**. FIG. **6** is a cross section of the main body portion of the nightstick **64** and is indicated by the reference numeral **14''**. FIG. **7** is a cross section of the handle portion which is generally indicated by the reference numeral **16''**. As illustrated in FIG. **7**, the handle portion **16''** is made entirely of thermoplastic material **19''** and does not have the outer layer of elastomeric material which covers the main body portion. The thermoplastic material **19''** of the handle portion **16''** is integral with the thermoplastic material **19''** of the main body portion **14''**. The advantage of the nightstick **64** is that it is relatively inexpensive to manufacture and the handle portion will not become loose from or separate from the main body portion. Also, the layer of elastomeric material **24''** provides the same advantages to the user as the elastomeric material **24** of the preferred embodiment.

THIRD MODIFICATION

Referring to FIG. **8**, there is shown a third modified nightstick, generally indicated by the reference numeral **68**. The nightstick **68** has the same general configuration as the nightstick **12** illustrated in FIG. **1**, including a main body portion and a handle portion, except that the nightstick **68** is made of the tubular metal **70** and filled with elastomeric material **72**. The handle and main body portions of the nightstick **68** have the same cross section illustrated in FIG. **8**. The metal of the handle portion is integral with the metal of the main body portion. The nightstick **68** is formed by molding as a single piece with the use of cores or by forming the handle and main body portions from tubular stock and welding them together. The elastomeric material **72** is either injected in a molten state into the hollow interior of the tubular metal or inserted in the solid state.

The main advantage of the nightstick **68** is that it is extremely strong. The nightstick **68** is also relatively inexpensive to manufacture and has shock absorbing qualitites due to the elastomeric material in the center.

It is obvious that minor changes may be made in the form and construction of the invention without departing from the material spirit thereof. It is not, however, desired to confine the invention to the exact form herein shown and described, but is desired to include all such as properly come within the scope claimed.

The invention having been thus described, what is claimed as new and desired to secure by Letters Patent is:

1. A nightstick consisting of

(a) an elongated cylindrical main body portion having a central longitudinal axis, and

(b) a generally cylindrical handle portion having a central longitudinal axis which is at a right angle to the central longitudinal axis of the main body portion, said handle portion being spaced from both ends of the main body portion and being substantially closer to one of said ends, said main body portion and said handle portion being a single molded one piece unit of polycarbonate.

* * * * *